HOME ON THE RANGE:
HOW TO COOK AN URBAN GOOSE [a]

by

W.T. Munro [b]
R.T. Sterling [c]
M.D. Noble [d]

WILDLIFE WORKING REPORT NO. WR-10
February 1985

[a] paper presented to the Wildlife Society Northwest Section Annual Meeting, Penticton, B.C. April 1984.

[b] Wildlife Branch, Victoria, B.C.
[c] Ducks Unlimited Canada, Kamloops, B.C.
[d] Canadian Wildlife Service, Penticton, B.C.

ABSTRACT

Canada goose (Branta canadensis) populations in the urban areas of the Okanagan Valley of British Columbia expanded rapidly during the 1970's causing numerous complaints from the public. A major, largely volunteer, attempt to halt the expansion by removing eggs and translocating young was undertaken. Enhancement of wild populations elsewhere was complimentary to the objective. Over 1000 goslings, most from eggs artificially incubated, were translocated. The problems, constraints, methods and results are described.

ACKNOWLEDGEMENTS

S.R. Cannings and C. MacNaughton graciously shared their knowledge of geese in the Okanagan. H.R. Hatfield kindly allowed us access to Hatfield Island to collect eggs. G.W. Kaiser permitted us to use his banding data from the Okanagan. G. Johnston provided property for holding pens prior to release of the geese.

In addition, we thank the many individuals from the following organizations who voluntarily cooperated on the project:

Canadian Wildlife Service
British Columbia Fish & Wildlife Branch
Ducks Unlimited Canada
Pitt Waterfowl Management Association
South Okanagan Sportsmen Association
Williams Lake Rod & Gun Club
Port Coquitlam Hunting & Fishing Club
Labatts Brewery
The Nest Pheasantry Ltd.
Swan Lake Animal Village

INTRODUCTION

Canada geese breeding in concentrations in or near urban settings have caused increasing problems in North America (Addison and Amernic 1983; Nelson and Oetting 1982). These problems range from the relatively innocuous hissing at passersby to the potentially fatal collisions with aircraft. Between the extremes, they scare and steal food from children, foul lawns, parks, beaches, and water supplies, and damage golf courses, pastures, and turf farms. In reasonable numbers, they are an asset to urbanites; in excessive numbers, they are a liability. Wildlife agencies have tried to cope with the excesses in a variety of ways including translocation of adults and young, scrambling eggs, sterilizing, hunting, and other forms of killing. This study deals with a portion of the Pacific population of the western Canada goose (Branta canadensis moffitti) which is the subspecies occupying the Okanagan Valley and central interior of British Columbia (Bellrose 1976; Krohn and Bizeau 1980; Ball et al. 1981).

The Okanagan Valley in South Central British Columbia (Fig. 1) is formed by a deep trench carved through a high plateau bordered on the southwest by the Cascade Mountains and on the east by the Monashee Mountains. A chain of lakes created through glacial action characterizes the valley bottom (at about 330 m). The climate is semi-arid with hot summers and mild winters. The deep lakes and slow flowing rivers are seldom completely frozen with little or no snow cover on the valley bottom during the winter period. Average winter temperatures are shown in Table 1. Krajina (1965) assigned the valley bottom to the Ponderosa Pine-Bunchgrass biogeoclimatic zone and the valley walls to the Interior Douglas Fir zone. The former zone is characterized by dry land grasses and shrubs and scattered yellow pine (Pinus ponderosa) while the latter is composed of grasslands and Douglas-fir (Pseudotsuga menziesii), yellow pine, and western larch (Larix occidentalis). Climate, soils, and abundant irrigation water has facilitated the valley bottom and benchlands becoming one of the most intensively farmed areas in the province and one of the outstanding tree-fruit production areas of Canada.

The Okanagan Valley experienced a rapid buiodup of Canada gees in the 1970's. In heavily populated areas of the valley, Canada geese have learned that food is abundant and hazards to survival are minimal. In the last 15-20 years, changes in land use have increased the green feeding and loafing areas for the birds. Lands have been cleared to make room for the new dwarf tree orchards, turf farms, pastures, golf courses, school playing fields, parks, and campgrounds. Orchards that at one time were clean-cultivated and ditch-irrigated are now seeded to grasses and mown and irrigated by sprinklers, creating many more feeding and loafing areas. Sprinkler irrigation on all these areas provides green grass for longer periods each year. In addition, food is provided by well-meaning members of the public, especially during the colder periods of the year when geese might normally migrate to southern wintering areas.

Although suitable nesting sites are fairly restricted, the high survival of young and adults resulting from local firearm discharge closures providing sanctuary during the hunting season has allowed the population to grow at a high rate. The increase in breeding geese is best documented by the number of nests found on a 1.4 ha island in Vaseux Lake, about 20 km south of Penticton, where they have increased from two in the early 1900's to 223 in 1983 (Table 2).

Few geese overwintered in the Okanagan in the 1920's and 1930's (Parham 1937). Christmas bird counts conducted by naturalist clubs since 1960 show a significant buildup of wintering geese in the 1970's (Table 3). Banding of Okanagan Valley birds by both the Canadian Wildlife Service and the British Columbia Fish and Wildlife Branch has shown the breeding population in the valley is largely resident (0 band recoveries outside the Okanagan from 45 adult-banded birds and only 6 recoveries as adults from 200 local-banded birds). We estimate the 1983 fall population at about 4000 birds.

The problems caused by the geese are varied but generally fall into two categories - nuisance and damage. Nuisances include excessive excrement on beaches, golf courses, wharves, campgrounds, and playgrounds; damage includes eating and pulling out grasses at turf farms, new pastures, golf courses, and airports. In 1983 alone, airport safety crews at Penticton had to frighten geese from active runways 87 times. Some public swimming areas have been used sparingly as a result of high fecal coliform counts in the water that may have been attributable to geese. Regional districts and local councils, as a result of increasing complaints by the public, had realized by the late 1970's that the problem was serious. Several discussions were held with wildlife agencies on options for resolving the problem. Relaxation of the firearms discharge restrictions to allow more hunting was one suggestion but that alone would not solve the problem, although it might help. Serious consideration was given to removal of goslings or eggs. Ducks Unlimited Canada and sportsmen expressed interest in transplanting young geese to parts of the central Interior Plateau which appeared to be understocked with geese.

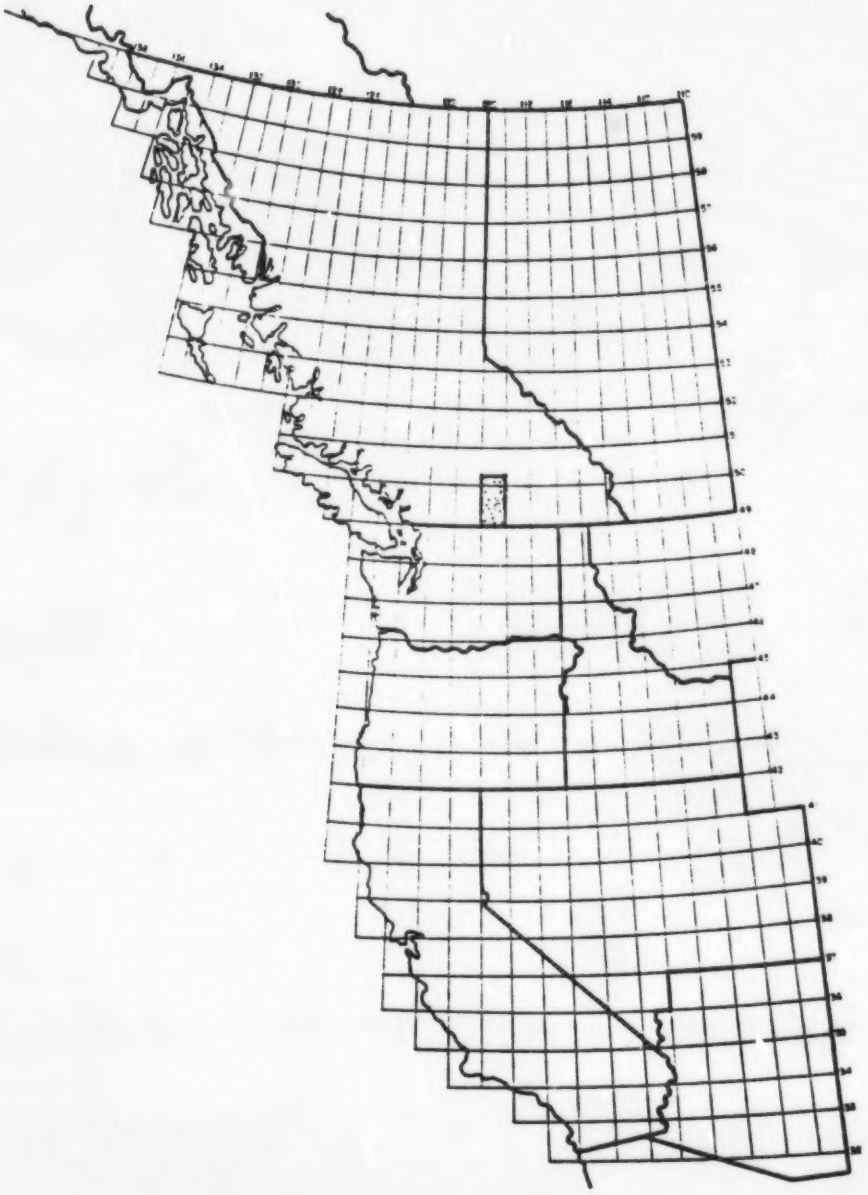

FIGURE 1: Location of Okanagan Valley, British Columbia.

Table 1. Winter temperatures - Penticton - 1941 to 1983[a].

Years	Avg. Mean Monthly Temp. (°C)		
	Dec	Jan	Feb
1941 - 1950	-1.6	-4.0	-1.0
1951 - 1960	0.2	-2.3	-0.1
1961 - 1970	-0.5	-2.3	1.5
1971 - 1980	-0.9	-3.6	0.3
1981 - 1983	-1.7	-0.5	2.2

[a] Source: Environment Canada, Penticton Airport.

Table 2. Number of goose nests, Hatfield Island.[a]

Year	No.	Year	No.
1913	2	1959	47
1919	3	1965	34
1933	30	1968	40
1936	13	1976	83
1949	37	1979	140
1950	50	1980	180
1951	51	1981	189
1955	39	1982	163
1956	49	1983	223
1957	47		

[a] Source: Canadian Wildlife Service files.

Table 3. Christmas bird counts - Canada Geese in the Okanagan Valley.[a]

YEAR	Summerland/ Naramata/ Penticton	Vaseux Lake	Oliver/ Osoyoos	Kelowna	Vernon	Total
1960	1	-[b]	-	-	0	1
1961	3	-	-	0	0	3
1962	0	-	-	0	0	0
1963	0	-	-	0	0	0
1964	96	-	-	0	0	96
1965	36	-	-	0	0	36
1966	8	-	-	50	0	58
1967	16	-	-	0	0	16
1968	14	-	-	19	8	41
1969	277	-	-	70	62	409
1970	16	-	-	43	131	190
1971	7	-	-	30	88	125
1972	72	-	-	41	321	434
1973	209	-	-	194	415	818
1974	250	60	-	357	261	928
1975	218	4	-	211	214	647
1976	488	272	-	565	301	1626
1977	574	33	-	214	363	1184
1978	856	223	110	346	312	1847
1979	571	271	33	688	477	2040
1980	802	269	437	870	566	2944
1981	866	417	793	963	1690	4729
1982	725	234	297	2351	669	4276
1983	562	150	226	442	343	1723

[a] Source: Naturalist Club Records, S. Cannings (pers. comm.).
[b] No counts taken that year.

PROCEDURES AND RESULTS

The British Columbia Fish and Wildlife Branch and the Canadian Wildlife Service, having already reviewed a number of options, approved the transplant concept and agreed to give the necessary government authorizations. However, some conditions had to be met to ensure the problem would neither be switched to another area nor be exacerbated by an influx of geese from the Interior. These conditions were:

1. Migration route and wintering area of wild young birds in the area of release would first have to be determined. If they stopped in the Okanagan, no transplants would be allowed.

2. A small release of transplanted flightless goslings, leg-banded and with neck collars, had to be made to a marsh with breeding geese so guide birds would be available for migration. Migration had to follow normal routes. If they stopped in the Okanagan, no further transplants would be allowed.

3. Subsequent releases had to have all the birds leg-banded and about 20% neck-collared. Again, adult birds must be present in the release area and the marshes must be in districts free from agricultural or urban conflicts.

In 1977 and 1978, Ducks Unlimited Canada banded a total of 195 wild flightless young geese in the Lac la Hache area of the Interior Plateau. Twenty-five direct recoveries (first hunting season after banding) showed those birds migrated to Sprague Reservoir, Washington and the Klamath area of Oregon and California (Fig. 2). Informal discussions with biologists from those areas suggested they could handle more wintering birds. Indirect recoveries (second and subsequent hunting seasons after banding) indicated a molt migration of non-breeding birds to northern Canada which is normal for this population (Krohn and Bizeau 1979). On the basis of those results, which met the first condition, approval was given for a small release of transplanted birds.

In 1981, 41 flightless goslings were caught and transplanted from the Okanagan to the Lac la Hache area. All were banded and neck-collared prior to release. Six direct recoveries were all from McKay Reservoir in Washington (Fig. 3). More importantly, not a single neck-collared bird was seen in the Okanagan Valley. Again, indirect recoveries indicated a molt migration to northern Canada. This spring those birds remaining alive will be of breeding age (3-years-old) and we will check the release area marshes to determine if any return to breed there as expected. The second condition having been met, approval was given for larger releases.

For a variety of reasons, we preferred to begin with eggs rather than goslings. Approval was given for egg collection, provided it was done late in incubation to prevent renesting. Collections were made in 1982 and 1983.

The main concentration of breeding Canada geese in the Okanagan Valley is at Vaseux Lake, located in the southern section. It is formed by a 4 km long deepening of the Okanagan River totalling some 300 ha with a maximum depth of 27 m, there are extensive marshy shallows and meadows especially in the north end,

which make it attractive to geese. Hatfield Island, where the highest concentration of Canada goose nesting occurs, is in the southern end. The 1.4 ha island has a rocky shoreline with a relatively flat surface about 1.5 m above high water level. The central part of the island has an open stand of yellow pine with grass ground cover and shrubs including red-osier dogwood (Cornus stolonifera), water birch (Betula occidentalis), wild rose (Rosa spp.), willows (Salix spp.), and hawthorn (Crataegus spp.) forming a dense perimeter.

The Canada goose nests are fairly uniformly distributed through the central part of the island, but are more concentrated just within the inner and outer edge of the perimeter shrubs. Nest materials include vegetative debris within reach of the nest such as pine needles, dead leaves, grass, and small twigs. The same sites are commonly used each year.

Nesting in 1982 and 1983 was initiated by March 15 with peak laying occurring in the third week of March. Hatching commenced April 19 in 1983 and April 16 in 1982, with the peak in the fourth week of April. Dump laying and scattered eggs suggested the island was nearing the saturation point for nesting pairs, and nesting success is likely to decrease if the numbers of geese attempting to nest continue to increase. In 1983, there were 223 nests, or 159 nests per hectare, an extremely high concentration for wild geese (Table 4).

The egg collection crews, supervised by a Ducks Unlimited biologist, consisted of 14 and 24 volunteers in 1982 and 1983, respectively. The teams worked in two groups, progressively from the centre of the island to the further ends. Apple picking baskets loaned by local orchardists were used to hold the eggs during collection. Each egg was marked with the teams identifying letter and the consecutive nest number. Other data, including number of eggs, whether warm (active) or cold (abandoned?), collected or flagged for future inspection, were noted on standard forms. The teams brought the eggs to the central marshalling area where they were transferred to standard egg cartons holding 30 goose eggs. About one hour was spent on the island. Transport time to the incubators was about six hours with cartons maintained at about 29.5°C. At the hatchery, the eggs were placed in pre-heated incubators. Candling to discard addled eggs was left until the following day. There were no immediate embryo losses attributable to the transport of eggs from nest to incubators. At pipping stage, the eggs were placed in hatching trays and from there to brooders. Hatching success in the commercial hatcheries varied from 78% in 1982 to 50% in 1983 (Table 5). After adjusting for losses due to equipment failure in 1983, it appeared the additional failures were mainly infertile eggs which may have been due to some disturbances during laying or early incubation.

Although the nest information is from only one inspection after the egg collection each year and therefore inconclusive, the large increase in nest numbers in 1983 may be from second nesting attempts rather than from increased pairs. Further, there was a greater proportion of cold nests (not in incubation) at collection in 1983 versus 1982, and these, from subsequent inspection, had a low hatching success (37%) compared to the warm nests (86%) (Table 6), again suggesting some mishap during laying or incubation had occurred. In each year, some eggs from the same nest have had different hatching dates. Usually these were from the larger clutches (more than 5) with some eggs hatching on the same day but others hatching irregularly, some 5-10 days later. These data suggest that eggs from more than one female were laid in the same nest, an indication of a saturated nesting area.

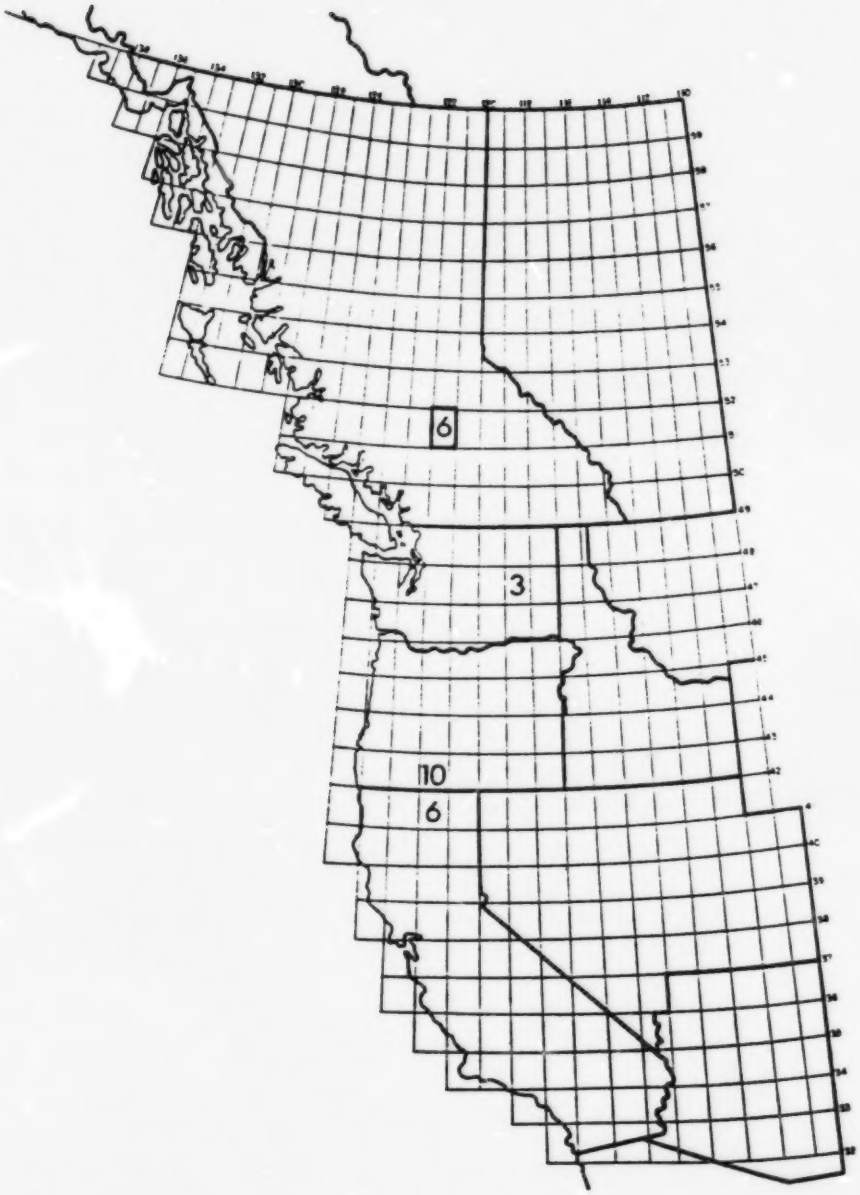

FIGURE 2: Local Wild Birds. Direct Recoveries, D.R. Rate 12.8%, N = 195.

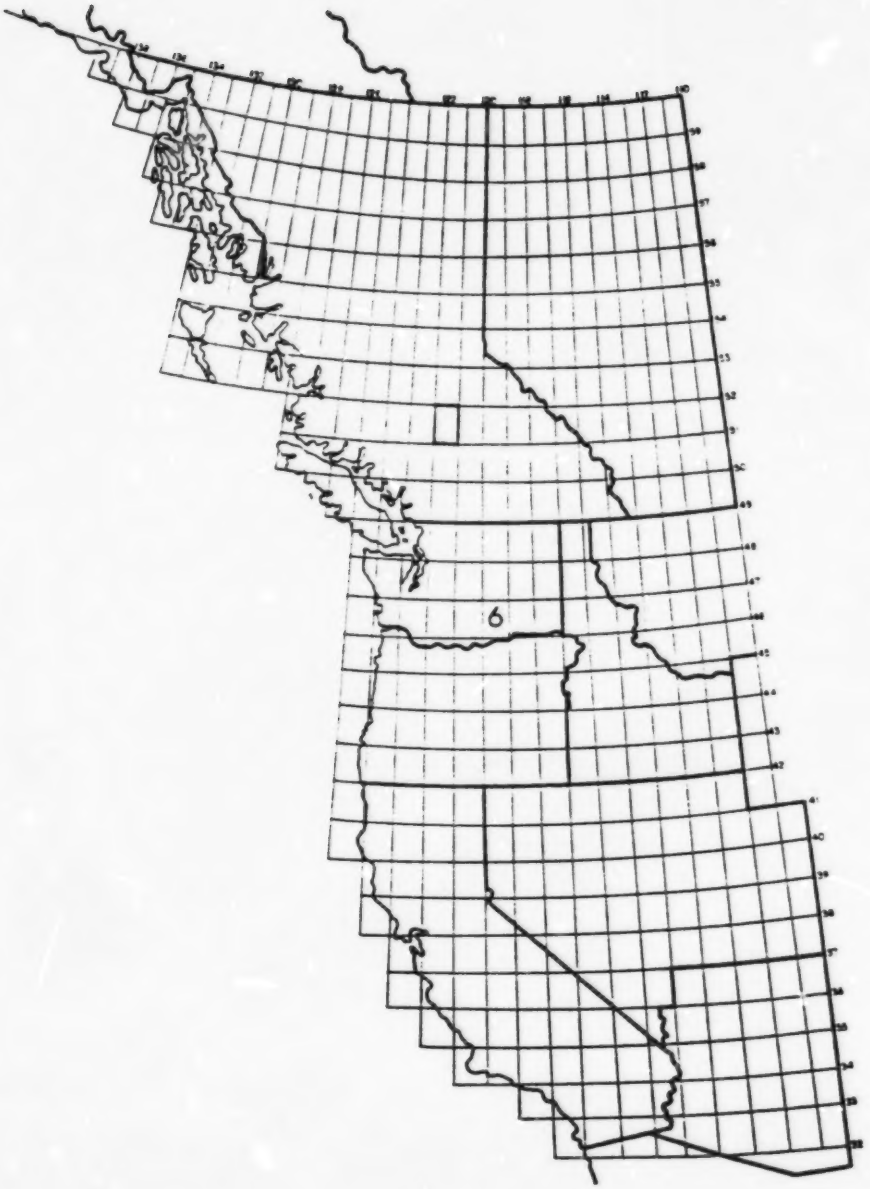

FIGURE 3: Local Experimental Transplanted Birds. Direct Recoveries. D.R. Rate 14.6%, N = 41.

Table 4. Number of nests, eggs,and clutch size of Canada Geese nesting on Hatfield Island, 1982 and 1983.

Year	Date	No. Nests	No. Eggs	Aug. Clutch
1982	April 18	163	940	5.8
	May 17	7[a]	31	5.4
1983	April 17	223	1250	5.6
	May 11	2[a]	9	4.5

[a] Assumed second nesting attempts.

Table 5. Number of eggs collected and number of healthy pre-flight goslings released to the wild.

Year	No. Eggs	No. Hatched	No. Released
1982	808	632 (78)	552[a] (87)
1983	845	425[b](50)	411(97)

[a] Gosling losses due to predators, culling, and accidents.
[b] Approximately 80 embryo fatalities due to incubator failure.

In 1982, one egg was left in each nest with the intention that it would maintain the incubation period to hatching and thus avoid renesting attempts which was deemed undesirable. However, the results indicated that there was a large degree of desertion of the one egg clutch (Table 6) and, because of the late stage of incubation, that renesting did not occur. Subsequently few young were noted on Vaseux Lake during the brood season. Therefore, in 1983, every fifth clutch was left to maintain future recruitment to the breeding stock. This proved a more successful and practical method to control more predictably the natural production and the local population. At least 20 full clutches were hatched on the island in 1983 and subsequently a group of some 100 young were noted maturing on the lake.

During the first weeks after hatching the artificially incubated goslings, while grazing on natural grasses and forbs, were heavily supplemented with commercial poultry foods. Poultry food was gradually eliminated from the diet by the last week before release (aged 4-8 weeks) to force the birds to forage for themselves.

The transfer of the young to the release sites some 700 km distance from the hatchery, was done in crates holding 15-20 birds each transported on an open deck trailer. The birds were given a high-protein feeding, watered, and then loaded in the cool of the evening for the overnight trip to the holding pens near the release site. Again local volunteers assisted with the banding, collaring, transporting, and releasing of the pre-flight goslings. Standard aluminum leg bands issued by the U.S. Fish and Wildlife Service were used. About 20% were also neck-collared with red plastic collars engraved with black identifying letters and numbers. Band recovery and collar sighting reports provide the information which identifies the local movements and dispersal of the birds as they establish their annual life-cycle.

The release sites, the 200 ha Chilanko and 300 ha Chilco marshes (Fig. 4), lie in the Fraser Plateau, which is part of the extensive Interior Plateau lying between the Coast and Cariboo Mountains. The Fraser Plateau is a broad rolling surface, with elevation between 1000 and 1500 m, supplied with marshy bordered lakes, marshes, and ponds attractive to waterfowl. Cattle ranching and small logging operations are the main economy of the area, supporting a few small villages. Little intensive agriculture is practised, therefore, crop damage by geese is unlikely.

It is an area of short, hot summers and long cold winters, much different than the moderate climate of the Okanagan Valley. The Canada goose breeding season is about one month later there and the forced fall migration, due to freeze-up, occurs in late October. Although a thinly distributed population of Canada geese nest on the marshes of the plateau, it is believed that the lack of safe natural nesting sites have maintained numbers at levels lower than the marshes could otherwise support. Chilanko and Chilco marshes are among the many marshes in the Fraser Plateau that have been enhanced by Ducks Unlimited Canada to overcome these limitations and, therefore, the introduced stock is expected to thrive accordingly. Both marshes now have island nesting sites and extensive sedge and grass areas suitable for feeding and brood maturing. One to three pairs of local geese had established breeding on these marshes since they were enhanced. We believed that flock bonds formed between these breeding birds and the introduced birds would establish the latter in the desirable traditional migration corridors and wintering areas.

Table 6. Hatching success of Canada Goose nests subsequent to egg collection.

Year	Date	Expt. Nests	Treatment	Inspected	Successful	Abandoned	Predated	Other
1982	May 17	156	1 egg left in warm nests having ≥3 eggs[b].	42	5(12%)	-	6	31
1983	May 11	52	clutch intact with ≥ 3 eggs	33				
			-18 warm nests	14	12(86%)	-	2	-
			-34 cold nests	19	7(37%)	8[c]	-	4

[a] No evidence of predation or hatching.

[b] Warm nests are assumed to be under incubation; cold assumed to be still in laying stage or abandoned.

[c] Eggs addled (4 nests still under incubation, but would eventually be abandoned.

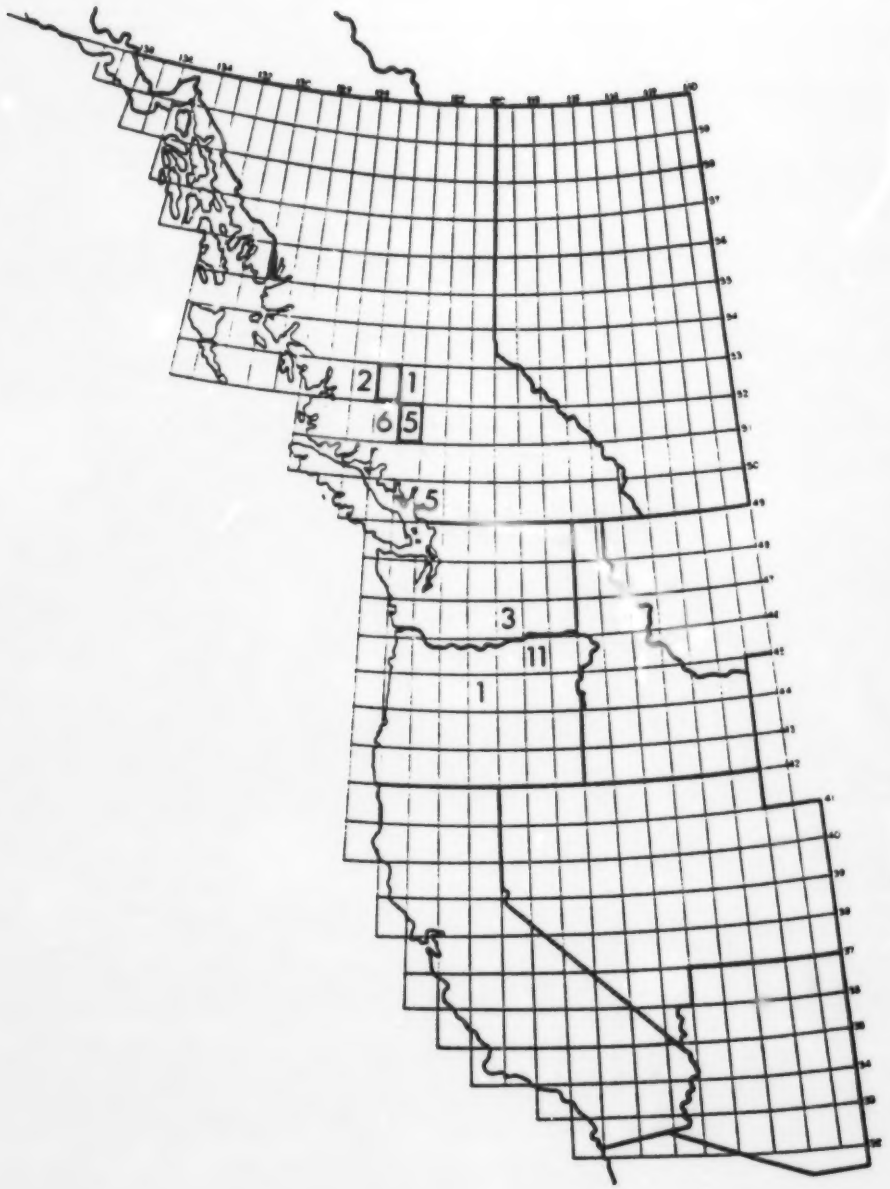

FIGURE 4: Local Transplanted Birds. Direct Recoveries.
D.R. Rate 6.3%, N = 543

In 1982, 552 goslings were released on the Chilko and Chilanko marshes. Standard aluminum leg bands were placed on 543 and neck-collars on 98 that also had leg bands. Thirty-four direct recoveries indicate a migration pattern somewhat different than the earlier bandings. Although 9% of the recoveries were in southern Washington, 35% were from Oregon, largely from McKay Reservoir (Fig. 4). The remaining recoveries were all in B.C., 41% on the release area and 15% from the lower Fraser Valley. Additionally, a number of neck-collar sightings (10 positvely identified during the 1982/83 winter) confirm that part of the released population was wintering in the lower Fraser Valley. This could account for the apparent low direct recovery rate (6.3%). No collared birds were seen in the Okanagan. Indirect recoveries indicate a northern molt migration. Information from indirect recoveries on the wintering grounds was not available from the banding office in time for inclusion in this paper.

Band recoveries from the wild birds and the pilot transplant of goslings led us to believe the migration route was likely to be confined to the Interior. We were surprised to find a substantial portion of the 1982 released birds wintering near the B.C. coast. The area in which the birds wintered in B.C. has the capacity to winter considerable numbers without agricultural conflict, provided they do not delay their northward migration. Observations in the spring of 1983 confirmed their early departure.

The fall migration routes of released and wild birds are shown in Figure 5. While the wild bird route is based on several years data including indirect recoveries the released bird route is based only on direct recoveries. We expect indirect recoveries will show migration continuing into California similar to the wild birds.

The program was continued in 1983 with the release of 411 goslings, 403 with standard bands, 98 of them also with neck collars. No recovery data are yet available for these birds.

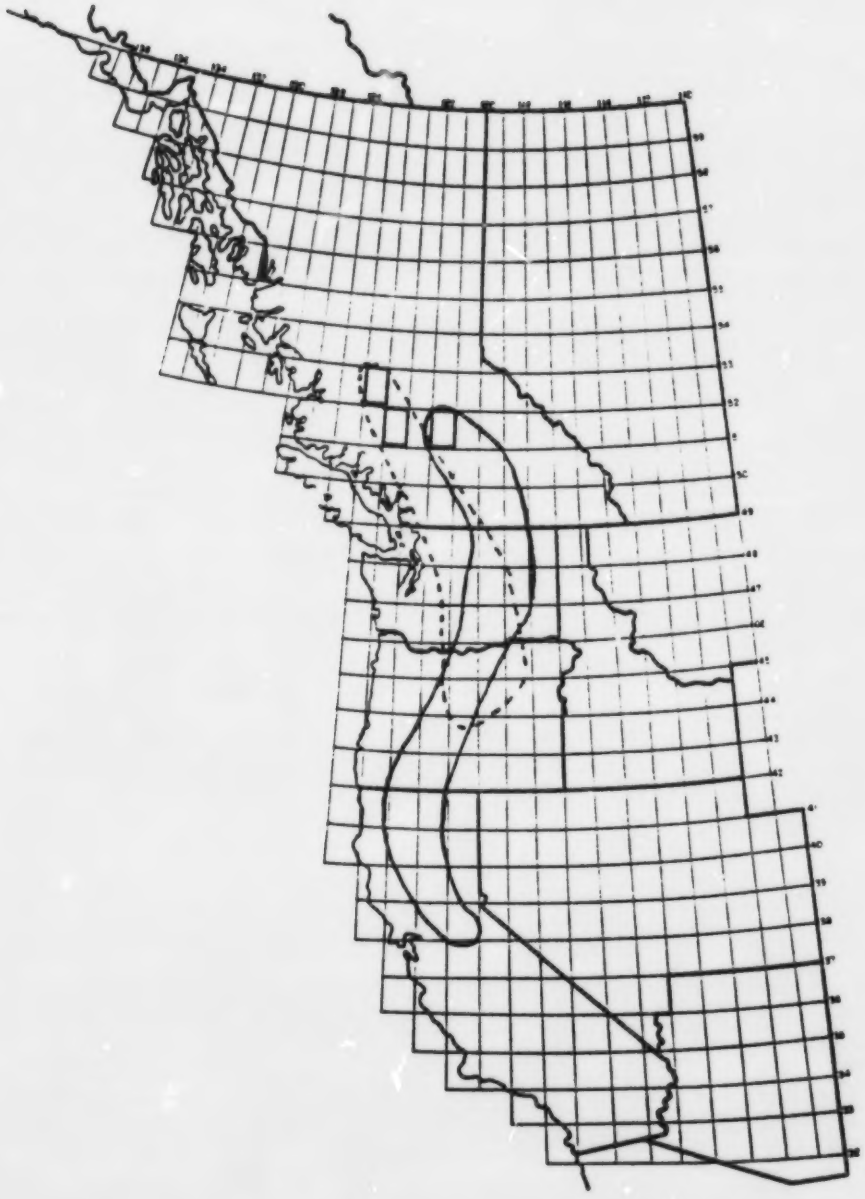

FIGURE 5: Fall Migration Routes.

Wild Birds _____

Released Birds -------

DISCUSSION

The basic question of whether the program is solving the problem is as yet unanswered. Certainly there are about 1000 fewer geese in the Okanagan Valley now than there would have been without the program. However, the number of complaints about problem geese have increased since the program started. We believe, in the absence of hard data, that the population has increased slightly since the program began. We also believe that efforts to date have significantly retarded the population increase. Given that Canada geese do not usually breed until 3-years-old, we would expect no stabilization or decrease in the population until the transplanted geese reach breeding age. About that time adult mortality should exceed recruitment and the population should decline. Actual results will depend on what proportion of the annual production we have succeeded in removing.

In the southern part of the valley we have likely taken a significant number of young and expect the population to decline gradually if we continue the program. In the central and northern portions of the valley we have not yet removed any young and those populations are still increasing. Our next step will be to remove eggs from those two populations.

The program is likely to continue, and perhaps expand, provided (a) the number of geese and complaints stabilize or decrease in the Okanagan and; (b) there are sufficient areas in the Interior Plateau and the wintering grounds to support more geese. The latter provision will be the subject of a separate paper.

LITERATURE CITED

Addison, L.R., and J. Amernic. 1983. An uneasy truce with the Canada goose. Int. Wildl. 13(6): 12-14.

Ball, I.J., E.L. Bowhay, and C.F. Yocom. 1981. Ecology and management of the western Canada goose in Washington. Wash. Dep. Game, Biol. Bull 17. 67pp.

Bellrose, F.C. 1976. Ducks, geese and swans of North America. Stackpole, Harrisburg, Pa. 544pp.

Krajina, V.J. 1965. Biogeoclimatic zones and classification of British Columbia. Ecol. of West. North Am. 1:1-17.

Krohn, W.B., and E.G. Bizeau. 1979. Molt migration of the Rocky Mountain population of the western Canada goose. Pages 130-140 in R.L. Jarvis, and J.C. Bartonek, eds. Management and biology of pacific flyway geese. Oreg. State Univ. Book Stores, Inc. Corvallis. 346pp.

_____. 1980. The Rocky Mountain population of the western Canada goose: its distribution, habitats, and management. U.S. Fish and Wildl. Serv., Spec. Sci. Rep. - Wildl. 229. 93pp.

Nelson, H.K., and R.B. Oetting. 1982. An overview of management of Canada geese (Branta canadensis) and their adaptation to suburban conditions in the U.S.A. IWRB Symposium on "Population ecology of geese" Debrecen, Hungary. Aquila 89: 303-306.

Parham, H.J. 1937. A nature lover in British Columbia. Witherby, London. 292pp.

Wildlife Working Reports should not be cited because of the preliminary nature of the data they contain.

WR-1 Progress report - coastal grizzly research project: Year 1. A.N. Hamilton. October 1984. 32pp. (Also printed as WHR-9).

WR-2 Progress report - coastal grizzly research project: Year 2. A.N. Hamilton and W.R. Archibald. October 1984. 30pp. (Also printed as WHR-10).

WR-3 Telemetry: Comments and suggestions from the coastal grizzly project 1983. A.E. Derocher. October 1984. 14pp. (Alsp printed as WHR-11).

WR-4 Habitat types of the Kimsquit River estuary. C. Clement. October 1984. 27pp. (Also printed as WHR-12).

WR-5 Biogeoclimatic units and ecosystem associations of the Kimsquit drainage. C. Clement. October 1984. 93pp. (Also printed as WHR-13).

WR-6 Kechika Enhancement Project of Northeastern B.C.: Wolf/Ungulate Management. 1983-84 Annual Report. J.P. Elliott. October 1984. 25pp.

WR-7 Muskwa Project Working Plan. J.P. Elliott. December 1984. 32pp.

WR-8 Muskwa Wolf Management Project of Northeastern B.C. 1983-84 Annual Report. J.P. Elliott. December 1984. 23pp.

WR-9 Kechika Enhancement Project of Northeastern B.C. Revised Working Plan for 1984-1987. J.P. Elliott. December 1984. 12pp.

WR-10 Home on the range: how to cook an urban goose. W.T. Munro, R.T. Sterling, and M.D. Noble. February 1985. 19pp.